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REPORT OF A CASE OF EPILEPSY OF FORTY- FIVE YEARS' DURATION, WITH AUTOPSY.¹

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THE patient, a female eighty-one years of age, died in February of the present year (1886). She was small in stature, of wiry, active build, and capable of enduring considerable physical strain. In old age she was lithe and active as a child, and possessed the characteristic of her family — of retaining the natural color of her hair, with few gray hairs, up to the day of death. She belonged to a long-lived family, a sister living to upwards of ninety-five, and another relative to over one hundred. She inherited no insanity, but some members of the family were nervous, impulsive, and quick-tempered. She was herself rather quick and impulsive in her feelings, and had such unusual ways of doing things that she was sometimes called eccentric.

She was married, had one child, and was in fair general health up to 1841, when she sustained a severe injury by being thrown from a carriage on to a stone wall, striking on her forehead. The point struck was in the middle of the forehead, about an inch above the supra-orbital arches, and exactly in the median line. An indistinct cicatrix at the point described has always been apparent on near inspection. It was round, and about the size of a half dollar. A relative states that the attending physician performed the operation of trepanning, or trephining, and the circular shape of the cicatrix, both of the scalp and skull, would

¹ Read March 18, 1886, before the Boston Medico-Psychological Society.



seem to bear out the assertion that the latter operation might have been done. A later medical attendant says that he never heard of it, but the probabilities are that it was performed.

The accident was followed by symptoms of concussion, and for several weeks the patient was unconscious and delirious. She slowly recovered from the accident, not regaining her former physical strength. Up to the year 1859 she continued in fair health mentally and physically, though growing more peculiar and eccentric. During these twenty years she passed through the change of life.

In 1859 she had the first attack of *grand mal* now known to the friends. That she had previously been subject to seizure of nocturnal epilepsy in the form of *petit mal*, the statements of some observers and the change in her condition furnish strong presumptive evidence. The attack of 1859 was characteristic. Others occurring soon after made it necessary to have her always in the company of some one else, in order that no accident might occur. These attacks were accompanied or followed by slight local paralysis, and the mouth became permanently drawn to the right side. Mental irritability also began to develop, accompanied sometimes by excitement, and later by delusive ideas and violence.

She finally became unmanageable at home, and in 1867 she was taken to the McLean Asylum. The record book of the Asylum refers to the accident, and says that "sight was lost for some time after the accident. After she could read, the slightest pressure on the base of either eye made her blind. There was also paralysis of the auditory nerves, hearing returning first in one ear, then in the other. Speech was also impaired. She had been having the epileptic seizures for six years, and her general health had been poor.

Sometimes she would have several during the twenty-four hours, then none for several days. Brown-Séquard had treated her, and for the year previous to admission, she had had no fits, but the general and mental condition had grown poorer. At admission seemed very feeble; speech was a little affected, there being a slight clipping of some words; the memory was weak; she had been excited at home, and turned against those about her." She remained at the asylum four months. During this time, she took forty grains of bromide of potass three times daily, and had only one fit. She was discharged as practically recovered so far as the attack of mental trouble was concerned.

From the time of her discharge to the summer of 1871, she was well enough to be at home, though having occasional attacks. In September of that year she was seized with a succession of epileptic convulsions, which followed each other in rapid succession to the number of twenty-five. After these she was excited and violent, and was kept for three days in a camisole. She turned against her husband, accusing him of being in league with the servants to poison her. She was then sent to the asylum at her own request, remaining nearly two months. She took one hundred and twenty grains of the bromide of potass daily, and had only two epileptic seizures. She was quite comfortable when discharged.

In 1875 she again had numerous attacks of *petit mal*, which had occasionally shown themselves since her last discharge. Becoming violent and unmanageable, she was again admitted to the McLean Asylum in a more excited condition than at any previous time. She soon became quiet, but had seizures of *petit mal* at frequent intervals, combined with irritability and various insane ideas. She now began to make many and extraordinary demands, such as having an aurist,

oculist, hair-dresser, chiropodist, female physician, etc., summoned immediately, and was extremely angry because her wishes were not immediately complied with. In the spring of 1876 she was discharged, being at that time somewhat better.

She was again admitted to the McLean Asylum in the summer of 1877 in about the same condition as at the last time, except that she was perhaps more violent, being brought to the asylum bound to an iron bedstead. She remained at the asylum until January, 1879, having periodical attacks of *grand* and *petit mal*, and growing mentally rather more feeble.

At this time she came under my care. On admission I made the note: "Her history points to attacks of nocturnal epilepsy, alternating with day attacks; reduced in flesh; complexion bad; pulse weak, 80; quite bright in conversation; memory fair; says she is very poor, and must save carefully; picks up threads wherever she sees them; wishes to do her washing, mix various strange drinks, etc." At that time mouth was drawn to the right side; there was no impediment in her speech; sight was good; heard well on the left side, not so well on the other side; walked naturally; face marked with numerous scars received probably in past epileptic seizures.

A few days after admission, a severe maniacal attack developed, following an attack of nocturnal epilepsy. She slept none at all at night; had on almost no clothing; kept on her feet constantly, and occupied her time in washing, dressing, greasing her furniture, tearing her clothing, etc. This attack lasted two weeks, and was followed by a period of comparative quiet, in which she drove out daily, took her meals at the table, etc. At this time (February, 1879), I made this note: "To-day, while talking, eyes became fixed; this was quickly followed by unconsciousness and slight convul-

sion (a tremor more properly), the latter lasting half a minute. For an hour after this seizure actions were peculiar and unnatural. After this time tired, but as well as before the attack."

In May, 1879, I made the note: "Attacks of *petit mal* average once or twice a week, and occur about one-fourth of times at night."

July, 1879, I entered in my record book: "Since the last report, has been through the usual states of excitement, depression, quiet and irritability. This morning had one of her seizures of *petit mal*, followed by mental confusion. She now (9 A.M.) shows no indication of such an attack, and, as is often the case, is brighter and apparently better after than before the seizure."

In August she was not so well again, and I wrote: "As usual in her excited state, makes a great variety of requests, and is with difficulty restrained from carrying out her wild projects. To-day she wishes to go to Hovey's and Pierce's to buy a great variety of presents; she wants mucilage, a box of cologne, ammonia for furniture polish, locks of various persons' hair to make ball ear-rings, currants to make currant jelly for her own house, perfumes of different kinds, patent medicines, etc. Must go to the tin-smith's, carpenter's and other places."

In September she was much depressed, sitting most of the time quiet and listless in her own room.

In October she had much improved. Took a natural interest in her surroundings, drove and walked daily, called on her friends, and appeared almost well.

In November, she had passed again into a state of excitement. At that time she intended to get up a national fair, for which she had arranged an elaborate programme, and she gave me a list of twenty articles

to buy. She had also prepared a mixture of water, figs, sugar-wine, and cuticura soap, which she said she drank with great benefit herself, and insisted on all persons taking.

She had at this time an attack of *grand mal*, but it seemed to have no connection with the general excitement.

November 22d, I made this note: "Has continued to grow more excited since last report. She will talk somewhat as follows: Has thirteen questions to ask as there are thirteen States; has put water into bottle of salt three times three because she was married in '33; has put ammonia into vessels with finely cut-up hairs to dissolve them; has bought four kinds of perfumes, one drop of each she proposes to put into rockers of her chair; wants poetry she has composed arranged to the best music, and have it sung publicly, and with the proceeds help her fair; wants four paper-weights bought and given to four prominent poets, one monster weight for the State-house; wants handsome pedometer bought for each State in the country; wants her brother's watch exhibited; wants to see the carpenter, plumber, baker, caterer, her old servants and numerous other people; wants her carriage repaired, and will present \$5.00 to each person who works on it.

The next day she said she would write a book equal to the Bible, from an inspiration she had the night before; was soaking her teeth in spring-water, spitting everything sweet into one vessel and everything bitter into another.

On the fifth of December following, she had a severe attack of *grand mal*, left side was almost motionless, then severely convulsed, convulsions extending to the entire body; left eye closed as she came out of attack; speech for half an hour after consciousness returned, indistinct; would constantly repeat the same words.

This attack was the worst one she had had up to that date.

In the course of two weeks she again became quiet and rational.

It should be stated that the sense of smell and taste seemed to be almost, if not entirely absent. This fact I did not discover until she had been under my care for some time. Her mouth was usually dry, and she often said she could never shed tears, which was a fact, as I never knew her to shed a tear in six years under my care.

In looking back over the year 1879, the patient's mental condition seemed to have presented many of the characteristics of *folie circulaire*, the periods of excitement and depression being very marked, and the latter followed usually by a period of comparative lucidity, and mental stability ; each period was, to be sure, quite short, and in that respect differing from *folie circulaire*.

A remarkable feature of the case, was the accompanying epileptic phenomena, which sometimes produced mental perturbation, but not at all at other times.

I do not mean to say that all the symptoms of mental instability were not dependent on epileptic discharges, but as observed externally, they took the form of *folie circulaire*.

The years 1880 and 1881 were not particularly eventful, the number of epileptic seizures averaging about the same. The patient's mind weakened a little, but so very little that it was hardly noticeable.

There were in these years more severe attacks of *grand mal*. The periods of excitement were about the same ; the quiet periods of longer duration.

All this time her general health was excellent ; her appetite was good, and when at her best it was not

easy to see that the strain of repeated epileptic attacks had affected her general condition. Very frequently she would say that she had never had a headache in her life, and could not imagine how it would feel to have a pain in her head.

In 1882 I noticed a change in the character of the maniacal attacks; instead of a prolonged period of excitement followed by depression, there was now a change on alternate days. In September, 1883, I wrote: "She is now emerging from a condition of alternate mania and melancholia occurring on alternate days. The symptoms of each form of disease are perfectly typical. One day she gives away everything, and is about to die; the next day there is the excitement and incoherent language of acute mania, with destruction of clothing, drinking of urine, etc."

The next record of interest was in February, 1883, up to which time she had improved. The alternating character of the disease grew less marked, and after several attacks of *petit mal* on January 11th, followed by great violence, she daily grew more rational.

In February I wrote: "Very rarely knows about epileptic seizures, but knew one was coming two nights ago; she says her vision was first affected, she saw a small rain-bow, which increased in size and seemed very beautiful, then this disappeared, and she felt a peculiar sensation in her abdomen in the region of the left ovary, which gradually grew higher and higher."

In May, 1883, I wrote: "Has been depressed and excited on alternate days. Slept very poorly every other night, and more irritable on excited days. Increased violence characterizes her advancing age. Has about two attacks of *petit mal* weekly, usually at night." Later in this month she had a severe seizure of *grand mal* preceded by several of *petit mal*. On

coming out of the attack the right side was found to be motionless, with mouth drawn to the left and left eye closed ; could not speak for several hours and then incoherently. The paralysis began to pass off in two days and was entirely gone in five days. Hallucinations of sight were marked at this time, though her mind was quite clear.

For three months following she was comparatively comfortable ; then the alternating attacks began. In December, 1883, I wrote: "She is one day bright, active and quite rational, and the next stupid, depressed and inclined to think she will die immediately. On the bright day her appetite has been good, and on the depressed day poor. The night of the depressed day good ; the night of the excited day not so good."

At this time she described the pre-epileptic aura, as "a face in a star, with one bright and one dull eye. The bright eye has numerous bright rays of light, like eye-lashes projecting from it." After this vision comes, as described before, a pain in the epigastric region.

In April, 1884, after a period of alternating insanity in February, and comparatively good health in March, she had an epileptic seizure followed by a temporary paralysis of the left side. She used meaningless words, generally misplaced, for some days after this attack.

In September of the same year, I wrote: "Since the above record, has had a variety of epileptic seizures, both *grand* and *petit mal*, and by day and night. Her memory and general intelligence have weakened considerably. She now lives much in the past, and often mistakes those about her for old friends. The right side is usually principally affected during a seizure, and her power of clear articulation has been permanently impaired. She finds it difficult to select the

right word, and is much irritated if not understood. She has occasional days of great irritability and violence, when she savagely attacks her nurse."

October and November following were months of comparative calm, and she was able to go to her meals, and drive, and walk a little, though her mind was weakened, as above recorded.

In December she was again violent. She attacked and pounded her nurse, seized her by the hair, tearing it out in handfuls, and was very furious. She had only six characteristic epileptic seizures during the month, though numerous attacks of violence, suspiciousness, depression, and cheerfulness. Her condition was very unstable, changing almost from one hour to another.

During the year 1885, the tendency was very slowly, but steadily downward. She was then in her eighty-first year, and the weakness, or lack of rallying power of advanced age, began to show itself. The number of epileptic and violent attacks were also greatly increased over any previous year, and tended to further reduce her strength.

In January, after an attack of *petit mal*, she saw and talked to an imaginary dog, heard him growl and was afraid of him. The same day she was violent and attempted to bite, and bit her own hands. She seemed to think she was a dog herself, and later during the year, when much excited, she imitated the actions and noises of animals, principally dogs.

She also began to make imaginary letters and write during this month, sometimes for an hour at a time, slowly going through the motions, dotting the i's, crossing the t's, and so forth.

On the 13th of January, there was cataleptic contraction of the arms. She would bend them at the elbow upward, and keep them bent until they were put down, then she would slowly raise them again.

On the 14th of January she saw a lion, and was afraid of him. She also made the motions of writing, and tried to spell the words. At this time she could not speak clearly, and some days had difficulty in walking.

On the 17th, she had an attack of *petit mal*; when she saw a dog, was very violent and called "murder."

She had a severe seizure of *grand mal* on the 27th, and thought she saw a bear. The next day another seizure occurred, when she saw a long dog, and tried to keep her feet away from it.

On the 30th, there were thirteen seizures, ten occurring in an hour and a half. Of these, two were severe *grand mal* seizures. On the 31st, there were one *grand mal*, and one *petit mal* seizure.

During the month of January, she had, altogether, twenty-three epileptic seizures, not including four severe attacks of violence, which were probably also due to epileptic discharges. There were not more than four quiet days. Nights were fairly good. No two days were alike. At different times in the same day, she was quiet, drowsy, depressed, irritable, suspicious, excited, and violent.

In February, between two seizures, thought she saw a black cat. She was not afraid of it, and tried to purr like a cat. During this month she had six epileptic seizures, and eight attacks of violence. The latter were only once near the time of an epileptic seizure, and then just before. They seemed to take the place of the epileptic seizures. There was more depression during this month, and more good days.

During March, there were three attacks of violence and thirteen epileptic seizures. About one-fourth of the days were quiet, and as natural as could be expected, with the gradual loss of mental power. One day she saw a dog behind a fence, and she tried to catch and

pound him. The general character of the month was like that of February.

In April, there were three attacks of violence, and ten epileptic seizures. Most of the days she was drowsy, suspicious, or irritable. Speech was growing more confused, and she realized little that was going on around her. She walked with more difficulty than before.

In May, four attacks of violence and ten epileptic seizures. The month was about like April.

During June, there were seven attacks of violence and seven epileptic seizures, several of the latter being severe. After one of them, she talked about a cow jumping over a fence. Her mind was now quite feeble; she lived almost entirely in the past, her conversation referring to her own home and family.

July was an unusually good month, as she got out to drive on thirteen different days. She saw a gray mare during this month, and did some imaginary writing. She had two attacks of violence and six epileptic seizures.

August was a trying month with her, as she had sixteen epileptic seizures, many of them severe, and two attacks of violence. When excited, she would often bite, and scratch like an animal during this month.

In September, there were seven epileptic seizures, most of them severe, and two attacks of violence.

In October, there were three attacks of violence and twelve epileptic seizures. Most of this month, when quiet, she was in a dazed or drowsy condition. She was settling into this state more and more as time went on, and only roused partially from it. She was less noisy in her violence, and, on the whole, less violent.

During November there were five attacks of violence, and nine epileptic seizures, none of the latter of unusual severity. She was less dazed this month, and

went to drive several times. She was unable to walk without assistance, and the right side was weaker than the left, and becoming more so. Her food she began to swallow with difficulty. She had bitten and growled like an animal several times, when excited, during the month.

In December there were no attacks of violence, and eleven epileptic seizures, two of these being severe. She had grown slightly more feeble during this month. The right side was weaker, and she had lost the power to masticate or swallow solid food.

Altogether, during the year there had been one hundred and thirty characteristic seizures and forty-two attacks of violence, which were of undoubted epileptic origin. If we add both kinds together, we have a total of one hundred and seventy-two epileptic attacks, which was a much larger number than in any previous year, as before stated, though they had not been before so carefully observed and counted.

During the month of January, 1886, she had nine epileptic seizures and four attacks of violence. The last epileptic seizure on the 31st was very severe, lasting some time, and being followed by several attacks of vomiting and twitching of the right eye and side.

After this time she was not able to sit up, though placed on a sofa. She also swallowed with difficulty, the milk, etc., remaining in her throat. Most of the time she was in a stupor, breathing heavily, and sometimes with difficulty. She sank gradually, and died on February 12th.

The autopsy was made fifty-two hours after death by Dr. A. N. Blodgett, assisted by myself, and the report is as follows:—

The body is that of a woman, of spare figure and medium height. The relative proportions of skull to face, and of the face to body, are apparently normal.

Upon the body is an old cicatrix, occupying a position in the median line, and three cm. above the line of the supra-orbital arches. Higher on the forehead, are the appearances of other old cicatrices. The scalp is normal; nowhere are any signs of depression or other abnormal conditions observed. The calvarium is thick and heavy, the frontal sinus is absent. The dura mater cerebialis is not unusually adherent to the calvarium, The convexity of the dura is the seat of four small grayish excrescences, varying in size from three to six mm., and rising about one mm. above the general niveau of the surrounding surface. The superior longitudinal sinus is empty. The dura is much thickened, bearing a close resemblance in some parts, especially over both anterior lobes, to a thick aponeurosis. It is unusually adherent to the pia, and when separated from the latter, is seen to present a marbled, or rather an embossed surface, as it is perceptibly thickened, and much more opaque in those parts which correspond to the intervals between the cerebral convolutions. The pia is everywhere quite vascular, and firmly adherent to the substance of the brain, from which it is difficult to separate it without injury to the cerebral tissues. About one hundred cc. of serous fluid is discharged from the cavity of the dura mater.

At a point corresponding to the cicatrix of the supra-orbital ridge, is seen on the inner surface of the skull, a surface about two cm. in diameter, which is the seat of a moderate, irregular hypertrophy, with three small, prominent bony protuberances extending about two mm. above the general surface of the bone around. From the posterior border of the crista Galli, and extending as far backward as the optic groove, is a surface ca. three cm. long by fifteen mm. broad, to which the dura mater and the substance of the brain are so firmly adherent that they cannot be separated without

laceration. The normal surface of the ethmoidal plate has been replaced by a dense and firm layer of bone, in which the perforations of the ethmoid are not preserved. The surface of the body of the sphenoid is raised above the normal level, and is thickly covered by small, elevated projections, to which portions of dura mater are inseparably attached. The entire surface is injected, and presents the appearances of chronic, progressive, osseous hypertrophy. The brain was removed with some difficulty, owing to the softened condition of the anterior lobes.

The vertebral arteries were the seat of extensive atheroma, and the inner coats were very loosely attached to the outer, so that they were easily separable. The entire basilar artery was the seat of the same atheromatous change, which had here intruded upon the inner surface of the vessel, so that its lumen was reduced in diameter at least one-half. The same condition existed in both posterior communicating arteries, and was especially marked in the carotids of both sides. This was also the case in the anterior cerebrals, and the anterior communicating artery was found to be entirely closed, being reduced to the appearance of fibrous cord. Thus the entire "Circle of Willis" was the seat of extensive atheromatous disease, the lumen of the basilar artery was reduced one-half by the encroachment of the same pathological process, and the walls of the vessel were much weakened. The calibre of the anterior communicating artery was obliterated at one point, so that there was no possibility of arterial supply to the opposite side of the brain through this channel. The anterior cerebral arteries were the seat of numerous small, aneurismal dilatations, as were the middle cerebral arteries of both sides. This condition existed through the entire fissure of Sylvius, on each side, and was noticed also in the primary ramifications of the distributing branches.

The frontal convolutions were flattened, the gray matter was thinned upon its periphery, and the convolutions presented the appearance of being subject to considerable pressure.

The ventricles contain but the normal amount of fluid, the consistence of the brain-matter is normal, and there is no appearance of pathological changes in these parts of the brain. Sections were made through the thalamus optici and through the entire hemispheres, as well as through the cerebellum, without discovering any notable signs of disease. Portions of the choroid plexus showed circumscribed patches of grayish color, due, apparently, to fatty changes of limited area.

Diagnosis ex Sectione. Pachymeningitis circumscripta. Hypertrophia duræ mat. Meningitis subacuta chronica. Atheroma arteriarum omn. Atresia arteriæ basilaris cerebri. Endarteritis obliterans arteriæ ant. com. Aneurisma circumscripta mult. Encephalitis circumscripta chronica. Hypertrophia basis cranii in os. front. et. sphen. med.

This case presents many features of interest, only a part of which I can consider this evening. The long duration, forty-five years, and the period of life which it covered are unusual. Few individuals have sustained so many and such severe attacks without succumbing much earlier.

No doubt the psychical form existed for the first twenty years after the accident, probably occurring as epilepsia mitior, or *petit mal*, and as nocturnal or larvated seizures. As time went on, the motor zones, as well as other portions of the brain, became more and more irritated, giving rise to the attacks of epilepsia gravior. That there is no pathological difference in the two forms, would seem to be borne out by this case. Either one was apt to occur, or one ran into another, and there was no regularity or periodicity to

any of the attacks. It can only be said that every few days, the number of times increasing as the disease progressed, there seemed to be a necessity on the part of the brain to bring about a discharge to restore its equilibrium. As has been stated by Seppilli in his experiments on animals, and other authors in regard to man, the intensity of the attack may be entirely different at different times in the same individual. It may be diminished, abolished, or exaggerated under the action of various causes. The attacks depend largely on the excitability of the cerebral motor centres.

The attacks of violence to which I have referred as being of epileptic origin, are interesting as being one of the substitutive forms of epilepsy, and resembling or similar to those occurring in cases of larvated epilepsy, so-called for want of a better name. Had the patient above described belonged to the criminal classes, or had her social environment been lower and attended by a severe and anxious struggle for the means of living, the automatic and unconscious act of violence might have taken a homicidal or suicidal direction. Echeverria² quotes Laségue, who pointed out the difference between the impulsive outbursts of ordinary insanity and epilepsy, as saying that unconsciousness stands prominently as the characteristic, distinctive of any act of violence perpetuated during the manifestations of the epileptic neurosis. "In either case," Echeverria says, "the original source of the transient fit is a morbid conception, whether impressed upon the sensorial regions of the brain by a precursory real emotion, or outer imitation, . . . or by some subjective inner feeling, the offshoot from a delusional groundwork that brings forth the excitation of sensory motor processes concerned in the insane abrupt act, automatically accomplished and elaborated in both cases in a coherent,

² Journal Mental Science, 1885.

logical manner, which necessarily involves a more or less considerable degree of deliberation." These last words are not correct as conveying the right idea of many of my patient's acts of violence, though the general explanation of the act seems extremely apropos. There were, however, attacks where a certain amount of coherence and deliberation were apparent. Thus on one occasion the patient got out of her window on to the roof of a little piazza. She was obliged to first place a chair on the roof, then with great care to step on to it, and then down. A very slight jar would have thrown her on to the ground. When once on the roof she felt she had accomplished her object to get the advantage of her nurse, and she remained quiet until brought back.

The varieties of insanity displayed in this case were extraordinary, and each kind was typical. Some of them occurred directly in connection with the epileptic attack, but others, as has been before stated, seemed to be independent, and the two varieties of symptoms, namely, those caused by the epilepsy and those caused by other exciting cerebral conditions, seem to run along together, or to jar against each other, producing many peculiar complications. In view of the extensive and peculiar post-mortem appearances, it is more easy to understand how this was possible.

The autopsy seems to show that the original injury was followed by an acute meningitis, which degenerated into a chronic meningitis, and the enormous hypertrophy, which is apparent on inspecting the dura mater is conclusive evidence of this fact. In this connection the following concerning the dura mater is of interest:

C. K. Mills, M.D., and J. W. White, M.D., report a case of epilepsy in which the operation of trephining was performed, and speak of the general nature of the spasms, which were not localized, nor confined to one

limb nor one side of the body. They think the spasmodic seizures "were probably due to irritation of the dura mater, what might be called dural, or meningeal spasms. They were not due to irritation of the cortical motor zone, the form of spasm sometime spoken of as Jacksonian epilepsy. Lesions of the motor cortex cause disorders in the opposite side of the body; irritative lesions cause monospasm, or unilateral spasm of the opposite side.

The researches of H. Duret³ on cerebral traumatism, have thrown considerable light on the rôle which the dura mater and its nerves play in these cases. Irritation of these branches of the trigeminal, or fifth pair of nerves which go to the dura mater, produces in addition to hyperæsthesia, pain and vasomotor disturbances, reflex spasms of peculiar character. Strong, powerful stimulation of the dura mater continued and developed was shown in certain physiological experiments of Bochefontaine to determine movements in both sides of the face, in the neck, and all four limbs. The movements of the limbs on the same side were more energetic than those on the opposite side.

The insane condition, apart from the epileptic, could be accounted for by the flattening of the frontal convolution, the thinning of the gray matter upon its periphery, and the indications of pressure.

The osseous hypertrophy of the middle portion of the sphenoid and ethmoid bones was remarkable. There was extraordinary roughening, and the appearances were similar to those that might be found in an old fracture. Not that any fracture had ever existed, but it seemed as if the force of the original blow had been projected backward and centred at this point, resulting in chronic inflammation, both of the meninges and

³ *Journal Nervous and Mental Diseases*, January, 1886.

bone. And it further seemed that this inflammatory trouble and the extraordinary growth and adhesion of the dura mater to the bone had gradually interfered with the circulation of the blood, through the circle of Willis, being in part the occasion of the thickening and occlusion of certain of its component vessels.

The nearness of the tempero-sphenoidal lobes may account for the loss (in part or in whole, it was not possible to determine which), of taste and smell, these lobes being given by Ferrier as the seat of these senses.

A further question which suggests itself is as to whether the occlusion of the anterior communicating artery and an evident degree of softening of the frontal convolutions had a bearing on the weakness of the right side?